

WHAT IS CLAIMED IS:

1. An interconnect for a semiconductor die comprising:
a substrate;
5 a conductor bonded to the substrate;
a contact member formed on the substrate and extending
to a height above the conductor, said contact member
configured to electrically contact a contact location on the
die; and

10 a conductive material in electrical communication with
the contact member and the conductor.

2. The interconnect as claimed in claim 1 wherein the
conductive material comprises a resilient material.

3. The interconnect as claimed in claim 1 wherein the
conductive material comprises conductive adhesive

4. The interconnect as claimed in claim 1 wherein the
conductive material comprises solder.

5. The interconnect as claimed in claim 1 wherein the
contact member is placed through an opening in the conductor
and the conductive material is deposited in the opening.

6. An interconnect for a semiconductor die comprising:
a substrate;
a conductor bonded to the substrate;
a contact member formed integrally with the substrate
30 and extending above the conductor, said contact member
comprising a pillar covered with a conductive layer
configured to electrically contact a contact location on the
die; and

660610-922060
a conductive material in electrical communication with the conductive layer and the conductor.

7. The interconnect as claimed in claim 6 wherein the
5 conductive material comprises conductive adhesive or solder.

8. The interconnect as claimed in claim 6 wherein the conductor comprises a metal foil attached to an insulating layer formed on the substrate.

10 9. The interconnect as claimed in claim 6 wherein the pillar is formed by etching the substrate.

10 10. The interconnect as claimed in claim 6 wherein the conductor comprises a multi layered tape bonded to the substrate with an adhesive.

11. The interconnect as claimed in claim 10 further comprising a ground plane formed on the tape for controlling an impedance of the conductor.

12. An interconnect for a semiconductor die comprising:
a substrate;

25 a contact member formed on the substrate comprising a pillar covered with a conductive layer, and configured to electrically contact a contact location on the die;

a multi layered tape attached to the substrate comprising a conductor and a polymer film; and

30 a conductive adhesive in electrical communication with the conductive layer and with the conductor.

13. The interconnect as claimed in claim 12 wherein the contact member includes a base formed by a stepped portion of the substrate.

14. The interconnect as claimed in claim 12 further comprising a second conductor on the tape having an impedance substantially equal to an impedance of the conductor.

5

15. The interconnect as claimed in claim 12 wherein the conductive layer comprises a material that is non-reactive with the contact location.

10

16. The interconnect as claimed in claim 12 wherein the contact member includes a projection configured to penetrate the contact location to a limited penetration depth.

15

17. The interconnect as claimed in claim 12 wherein the conductor comprises patterned copper foil.

18. An interconnect for testing a semiconductor die, comprising:

a substrate;

20

a contact member comprising a pillar formed integrally with the substrate, said contact member further comprising a conductive layer formed thereon configured to electrically contact a contact location on the die;

25

a conductor comprising a metal foil bonded to the substrate; and

a conductive material in electrical communication with the conductive layer and the conductor.

30

19. The interconnect as claimed in claim 18 wherein the pillar includes a base with the conductive layer thereon and with the conductor overlapping the conductive layer.

20. The interconnect as claimed in claim 18 wherein the conductive material comprises forms an expansion joint between the contact member and conductor.

5 21. The interconnect as claimed in claim 18 wherein the conductive material comprises a solder and the conductive layer and conductor comprise a solder wettable metal.

10 22. An interconnect for making an electrical connection with a contact location on a semiconductor die, comprising:

a substrate;

a contact member formed on the substrate, said contact member comprising a raised pillar formed integrally with the substrate and covered with a conductive layer;

15 a multi layered tape bonded to the substrate, said tape comprising a metal conductor laminated to a polymer film, said conductor including an opening surrounding the contact member with the contact member projecting therefrom; and

20 a conductive adhesive deposited in the opening in electrical communication with the conductive layer and the conductor.

25 23. The interconnect as claimed in claim 22 wherein the substrate includes a plurality of contact members and the tape includes a plurality of conductors having a plurality of openings aligned with the contact members.

30 24. The interconnect as claimed in claim 22 wherein the contact member includes a base formed in the substrate.

25. The interconnect as claimed in claim 22 wherein the contact member includes a base covered with the conductive layer and the conductor overlaps the conductive layer.

26. The interconnect as claimed in claim 22 wherein the conductor comprises copper foil and the polymer film comprises polyimide.

27. An interconnect for a bumped semiconductor die comprising:

a substrate;

a depression formed in the substrate, said depression sized to retain a bumped contact location on the die;

a conductive layer formed in the depression; and

a multi layered tape comprising a conductor and a film attached to the substrate, said conductor in electrical communication with the conductive layer.

28. The interconnect as claimed in claim 27 wherein the tape includes a plurality of conductors having a matched impedance.

29. The interconnect as claimed in claim 27 wherein the conductor includes an opening sized and shaped to retain the bumped contact location.

30. The interconnect as claimed in claim 27 wherein the substrate comprises silicon or ceramic.

31. An interconnect for a bumped semiconductor die, comprising:

a substrate having a depression formed therein sized to retain a solder bump on the die;

a contact member comprising a conductive layer formed in the depression;

a conductor attached to the substrate comprising a metal foil having an opening aligned with the depression; and

an electrically insulating layer formed between the conductor and substrate.

32. The interconnect as claimed in claim 31 wherein the substrate comprises ceramic and the electrically insulating layer comprises an adhesive.

33. The interconnect as claimed in claim 31 wherein the substrate comprises silicon and the electrically insulating layer comprises silicon dioxide.

34. A method for forming an interconnect for a semiconductor die comprising:

providing a substrate;
forming a raised contact member on the substrate;
covering the contact member with a conductive layer;
attaching a metal conductor to the substrate proximate to the contact member; and

depositing a conductive material on the substrate in electrical communication with the conductive layer and the conductor.

35. The method as claimed in claim 34 wherein the metal conductor comprises a copper foil laminated to a polymer film.

36. The method as claimed in claim 34 wherein the conductive material comprises a conductive adhesive.

37. The method as claimed in claim 34 wherein the conductive material comprises a solder.

SUB
Aa

09302576-043099

SUB
Aa
cont.

38. A method for forming an interconnect for making electrical connections with contact locations on a semiconductor die, comprising:

providing a substrate;

5 forming a pattern of contact members on the substrate configured to electrically contact the contact locations on the die;

forming a plurality of conductors including a plurality of openings therethrough, said openings formed in a pattern
10 that matches the pattern of contact members;

attaching the tape to the substrate with the contact members projecting through the openings; and

depositing a conductive material in the openings in electrical communication with the contact members and
15 conductors.

39. The method as claimed in claim 38 wherein the contact members are formed by etching the substrate and depositing a conductive layer.
20

40. The method as claimed in claim 38 wherein the conductive material comprises a conductive adhesive.

41. The method as claimed in claim 38 wherein the
25 conductive material comprises a solder.

42. The method as claimed in claim 38 wherein the conductors comprise metal foil laminated to a polymer film.

30 43. A method for forming an interconnect for a semiconductor die, comprising:

providing a substrate;

forming a contact member on the substrate, said contact member including a base, a pillar and a projection configured

09302576-043099

SUB
Aa
cont.

to penetrate a contact location on the die to a limited penetration depth;

forming a multi layered tape comprising a polymer film and a metal conductor formed thereon;

5 attaching the tape to the substrate with the conductor proximate to the contact member; and

electrically connecting the contact member to the conductor by depositing a conductive material on the contact member and conductor.

10

44. The method as claimed in claim 43 wherein the conductor includes an opening aligned with the contact member and the conductive material is deposited in the opening.

15

45. The method as claimed in claim 43 wherein the conductive material comprises a conductive adhesive.

20

46. The method as claimed in claim 43 wherein the conductive material comprises a solder.

25

47. The method as claimed in claim 43 wherein attaching the tape comprises forming an adhesive layer between the tape and substrate.

30

48. A method for forming an interconnect for a bumped semiconductor die, comprising:

providing a substrate;

forming a depression in the substrate sized to retain a bumped contact location on the die;

30

covering at least a portion of the depression with a conductive layer; and

attaching a conductor to the substrate in electrical communication with the conductive layer and electrically insulated from the substrate.

SUB
A2
conc.

49 The method as claimed in claim 48 wherein the conductor includes an opening surrounding the depression.

5 50. The method as claimed in claim 48 wherein the conductor comprises a metal foil laminated to a polymer film.

51. The method as claimed in claim 48 wherein attaching the conductor comprises forming an adhesive layer between the
10 conductor and substrate.

52. A system for testing a semiconductor die comprising:

a temporary package for the die; and
15 an interconnect mounted to the package for establishing temporary electrical communication with the die;

said interconnect comprising a substrate, a contact member formed integrally with the substrate configured to electrically contact a contact location on the die, a
20 conductor attached to the substrate, and a conductive material in electrical communication with the contact member and the conductor.

53. The system as claimed in claim 52 wherein the
25 conductor comprises a metal foil laminated to a polymer film.

54. The system as claimed in claim 52 wherein the contact member comprises a pillar covered with a conductive layer.
30

55. The system as claimed in claim 52 wherein the conductive material comprises a conductive adhesive.

09302576-043099

56. The system as claimed in claim 52 wherein the conductive material comprises a solder.

57. A system for testing a semiconductor die comprising:

a temporary package for the die; and

an interconnect mounted to the package for establishing temporary electrical communication with the die;

said interconnect comprising:

a substrate;

a conductor attached to the substrate including an opening formed therein;

a contact member formed integrally with the substrate, said contact member extending out of the opening and configured to electrically contact a contact location on the die; and

a conductive material placed in the opening in electrical communication with the contact member and the conductor.

58. The system as claimed in claim 57 wherein the conductive material comprises a conductive adhesive.

59. The system as claimed in claim 57 wherein the conductive adhesive comprises a solder.

60. The system as claimed in claim 57 wherein the contact member comprises an etched pillar covered with a conductive layer.

61. A system for testing a bumped semiconductor die comprising:

a temporary package for the die; and

an interconnect mounted to the package for establishing temporary electrical communication with the die;

said interconnect comprising:

a substrate;

a depression formed in the substrate, said depression sized to retain a bumped contact location on the die;

a conductive layer formed in the depression; and

a conductor attached to the substrate in electrical communication with the conductive layer, said conductor including an opening aligned with the depression.

62. The interconnect as claimed in claim 61 wherein the conductor comprises a metal foil attached to the substrate with an electrically insulating adhesive.

63. The interconnect as claimed in claim 61 wherein the opening is sized and shaped to retain the bumped contact location.

64. The interconnect as claimed in claim 61 wherein the substrate comprises ceramic.

65. A system for testing semiconductor dice contained on a wafer, comprising:

a wafer probe handler in electrical communication with testing circuitry;

a probe card mounted to the wafer probe handler comprising a substrate and a plurality of contact members configured to electrically connect to contact locations on the dice; and

a tape comprising a polymer film and a plurality of conductors in electrical communication with the contact members, said tape configured to physically attach the probe

card to the wafer probe handler with the contact members in electrical communication with the testing circuitry.

66. The system as claimed in claim 65 further
5 comprising a conductive adhesive for electrically connecting the contact members to the conductors.

67. The system as claimed in claim 65 further
10 comprising a solder for electrically connecting the contact members to the conductors.

ADD
A3

09302576-043099